

REMARKS

Pending in the application are claims 1-47, of which claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance

Objections to the Abstract:

The Abstract has been objected to for exceeding 150 words. Applicant submits an amended Abstract which is below 150 words. In view of this newly amended abstract, Applicant believes that the Examiners objection has been overcome.

Informality Objections to claim 18

Claim 18 has been objected to due to a typographical error. Application submits amended claim 18, wherein the term “a first reaction masses” has been replaced with “a first reaction mass.” In view of this amendment, Applicant submits that the Examiners Objection has been overcome.

Rejections Pursuant to 35 U.S.C. §102(b)

The Examiner rejected claims 1-4, 8-10, 12-14, 18-19, 23-25, 27, 31-36, and 41-44 pursuant to 35 U.S.C. §102(b), as being unpatentable over U.S. Patent No. 4,715,470 to Paulsson (Hereinafter Paulsson). Applicants respectfully traverse this rejection

The present invention, recites an acoustic borehole source and method of using the source for generating elastic waves through an earth formation. The acoustic source is comprised of at least a first motorized reaction mass, as recited in the pending independent claims, and at least two pads. The motorized reaction mass is positioned along the axis of the sonde. Furthermore, the pads are connected to the sonde and the motorized reaction mass using *variable angle* pushing rods. The pad and *variable angle* pushing rod arrangement allows for the generation of elastic waves through the earth formation upon activation of the motorized reaction mass. Furthermore, by controlling the angle of the *variable angle pushing rods impedance of the present invention may be controlled* for using in a variety of earth

formations having variable impedance properties. Applicant respectfully submits that the variable angle pushing rod and impedance control arrangement is recited in presently amended claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45, all of which are independent.

Summary of Paulsson

The cited reference to Paulsson recites a downhole seismic source capable of generating seismic forces for use in making seismic measurements. Paulsson includes a seismic source having an outer housing, a fixed angle means for clamping the source securely to the wellbore, and a linear electromagnetic actuator which utilizes permanent magnetic material having remanent magnetic field exceeding about 0.9 T such as rare earth permanent magnetics.

Arguments

Applicants respectfully submits that the cited art to Paulsson fails to recite or disclose each element of the presently amended claims. Firstly, Applicant submits that Paulsson fails to recite the variable angle pushing rod and pad arrangement of the present invention. Such an arrangement is clearly recited in the pending independent claims and fully supported by the specification as filed. Additionally, by controlling the angle of the pushing rod, the impedance of the acoustic borehole source may be controlled. As recited in the specification at pages 9-10, "It is noted that specific pad/motor configurations may be preferred depending on the nature of the formation encountered, for example to adapt the impedance in a soft formation." Control of the variable angle pushrod and pad assembly, as illustrated in Figure 4 of the present invention, illustrates the relationship between the variable pushing rod angle and the source impedance. In one example, when encountering a soft formation a small alpha angle may be utilized to generate a best sonic signature in the borehole using the borehole source of the present invention. In contrast, a very hard formation may require an alpha angle approaching ninety degrees for best use of the present invention.

In contrast, Applicant respectfully submits that the Paulsson reference solely recites a clamping means wherein the angle of the clamping means is fixed. Once such example of this fixed clamping means is noted by the Examiner at Column 2 lines 58-59 of Paulsson,

wherein a hydraulic actuated piston is detailed. Furthermore, as illustrated in Figures 1 and 3 of Paulsson, the clamping means is fixed at a perpendicular angle to the body of the seismic source. As Paulsson fails to recite or disclose the variable angle pushing rod arrangement of the present invention, wherein this variable angle pushing rod is utilized in controlling the impedance of the acoustic source, Applicant believes that the Paulsson reference fails to anticipate presently pending independent claims 1,8,18,23,31,34,37,41,43 and 45. Applicant therefore respectfully requests that the Examiner withdraw the rejection to these claims and pass them to allowance.

Applicant further submits that dependent claims 2-7, 9-10, 12-14, 19, 24-25, 27, 32-33, 35,36, 42 and 44, which rely on the aforementioned independent claims for support, are in condition for allowance as they serve to further limit an allowable independent claim. Applicant requests that the rejections to these dependent claims be withdrawn and that these dependent claims be passed to allowance as drafted.

Rejections Pursuant to 35 U.S.C. §103(a)

The Examiner rejected claims 1-5, 8-10, 12-15, 18-20, 23-25, 27-28, 31-36, and 41-44 pursuant to 35 U.S.C. §103 as being unpatentable over Paulsson (U.S. Patent No. 4,715,470) (hereinafter “Paulsson”) in view of Hademenos (U.S. Patent No. 4,926,937) (hereinafter “Hademenos”). The Examiner rejected claims 6-7, 11, 16-17, 21-22, 29-30, 37-40, and 45-47 pursuant to 35 U.S.C. §103 as being unpatentable over Paulsson in view of Hademenos in further view of Sakata (U.S. Patent No. 5,187,331). For the reasons set forth below, Applicants respectfully traverse these rejections.

Applicants respectfully traverse each and every one of the 35 U.S.C. 103 rejections because Hademenos does not disclose “variable angle push rods” as claimed in the present application.

First, as the examiner correctly identifies Paulsson does not disclose that the impedance can be controlled using said plurality of push rods. However, the Examiner never identified that Hademenos disclosed this feature or that the combination of the two references disclose this feature. Specifically, Hademenos only discloses the use of the “arm assembly”

in order to “urge the sonde against the bore hole wall 26.” (See Hademenos Column 3 lines 1-13). There is no disclosure of controlling the impedance.

Second, Hademos discloses an arm assembly and not a “variable angle push rod” as in the present application. The examiner clearly identifies an arm assembly disclosed by Hademenos. Specifically, the examiner states:

Hademenos however discloses the use of variable angle pushing rods (30 42 40 44 in figure 6) for connecting a toll to a borehole (Column 3 lines 1-13). (See Office action dated 9/14/2006.)

As identified by the examiner the arm assembly disclosed by Hademenos is an assembly of 4 arms (30 42 40 44 in figure 6). In contrast, the each of the “plurality of variable angle push rods” claimed in the present application is a single rod. (See Fig. 1-4 of the present application.)

Third, neither Hademenos nor Paulsson offer a suggestion or motivation to combine. MPEP 2143.01 requires the examiner to identify a motivation in the prior art to combine. In this instance, the prior art actually teaches away from the present application because of the use of the “arm assembly”. Due to the structure of the arm assembly the it would be difficult to control the generated “elastic waves” because the force would be distributed along each of the elements of the arm assembly rather than axially along the “push rod”.

Applicant submits that the cited art, when viewed either alone or in combination, fails to render claims 1-47 obvious. Applicant therefore urges the Examiner to withdraw the rejection under 35 U.S.C. §103(a) and pass claims 6-7,11,16-17,21-22,29-30,37-40 and 43-47 to allowance.

Conclusion

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes no additional fee is due with this response. However, if a fee is due, please charge our Deposit Account N°. 19-0615, under Order No. 60.1543 from which the undersigned is authorized to draw.

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Respectfully submitted,

By 

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